

## CLAIMS

1. A silicon nitride film formation method, comprising:  
heating a substrate to be subjected to film formation to a substrate temperature;  
heating a wire to a wire temperature;  
5 supplying silane, ammonia, and hydrogen gases to the heating member; and  
forming a silicon nitride film on the substrate.
2. The method of claim 1, wherein the substrate temperature is in the range of about 200  
- 400°C.
3. The method of claim 1, wherein the wire temperature is in the range of about 1800 -  
10 2100°C.
4. The method of claim 1, further comprising conducting the silicon nitride film  
formation method at a pressure in the range of about 10 - 50 millitorr.
5. A method for forming a silicon nitride film, comprising:  
providing a process chamber;  
15 heating a substrate contained within the process chamber to a substrate temperature;  
heating a wire contained within the process chamber to a wire temperature;  
supplying a silicon precursor material to the process chamber;  
supplying a nitrogen precursor material to the process chamber;  
supplying a process gas to the process chamber; and  
20 forming a silicon nitride film on the substrate.
6. The method of claim 5, wherein the silicon precursor material is selected from the  
group consisting of  $\text{SiH}_4$ ,  $\text{Si}_2\text{H}_6$ , and  $\text{SiH}_2\text{Cl}_2$ .

7. The method of claim 5, wherein the nitrogen precursor material is selected from the group consisting of  $N_2$  and  $NH_3$ .

8. The method of claim 5, wherein the process gas comprises hydrogen.

9. The method of claim 5, wherein the substrate temperature is in the range of about 200 - 400°C.

10. The method of claim 5, wherein the wire temperature is in the range of about 1800 - 2100°C.

11. The method of claim 5, further comprising conducting the silicon nitride film formation method at a pressure in the range of about 10 - 50 millitorr.

10 12. Apparatus for forming a silicon nitride film on a substrate, comprising:  
a process chamber;  
a substrate heater positioned within said process chamber, said substrate heater configured to receive the substrate;  
a wire positioned within said process chamber;  
15 a supply of silicon precursor material operatively associated with said process chamber;  
a supply of nitrogen precursor material operatively associated with said process chamber; and  
a supply of process enhancement gas operatively associated with said process  
20 chamber.

13. The apparatus of claim 12, wherein the silicon precursor material is selected from the group consisting of  $SiH_4$ ,  $Si_2H_6$ , and  $SiH_2Cl_2$ .

14. The apparatus of claim 12, wherein the nitrogen precursor material is selected from the group consisting of  $N_2$  and  $NH_3$ .

15. The apparatus of claim 12, wherein the process gas comprises hydrogen.

16. Apparatus for forming a silicon nitride film on a substrate, comprising:

a process chamber;

heating means positioned within said process chamber for heating the substrate to a substrate temperature;

a wire positioned within said process chamber;

means for providing a silicon precursor material to said process chamber;

means for providing a nitrogen precursor material to said process chamber; and

means for supplying a process enhancement gas to said process chamber.

17. The apparatus of claim 16, wherein said means for providing a silicon precursor material to said process chamber comprises means for providing  $SiH_4$  to said process chamber;

18. The apparatus of claim 16, wherein said means for providing a nitrogen precursor material to said process chamber comprises means for providing  $NH_3$  to said process chamber.

19. The apparatus of claim 16, wherein said means for supplying a process enhancement gas to said process chamber comprises means for providing  $H_2$  to said process chamber.